



Economic gradients in early child neurodevelopment: A multi-country study

George L. Wehby^{a,*}, Ann Marie McCarthy^b

^a Department of Health Management and Policy, College of Public Health, University of Iowa, 105 River Street, N248 CPHB, Iowa City, IA 52242, USA

^b College of Nursing, CNB 404, The University of Iowa, Iowa City, IA 52245, USA

ARTICLE INFO

Article history:

Available online 8 December 2012

Keywords:

Argentina
Brazil
Chile
Ecuador
Child development
Socioeconomic status
Wealth
Disparities

ABSTRACT

Little is known about the importance of household wealth for child neurodevelopment very early in life including during infancy. Previous studies have focused on specific developmental domains instead of more holistic multi-domain measures of neurodevelopment and on economic effects for the “average” child instead of evaluating the heterogeneity in economic gradients by different levels of developmental ability. Furthermore, not much is known about whether economic gradients in early child neurodevelopment are country-specific or generalizable between populations. We evaluate wealth gradients in child neurodevelopment, an important predictor of future health and human capital, between ages 3 and 24 months in four South American countries. We also assess the heterogeneity in these gradients at different locations of the neurodevelopment distribution using quantile regression. Employing a unique dataset of 2032 children with neurodevelopment measures obtained by physicians in 2005–2006, we find a large positive wealth gradient in neurodevelopment in Brazil. The wealth gradient is larger for children at higher neurodevelopment rankings, suggesting that wealth is associated with child development inequalities in the form of a wider gap between low and high achievers on neurodevelopment in Brazil. This result highlights the need to target poverty in Brazil as a key factor in health and human capital disparities earlier in life rather than later as early developmental deficits will be carried forward and possibly multiplied later in life. More importantly, small or insignificant wealth gradients are generally found in the other countries. These results suggest that wealth gradients in child neurodevelopment are country-specific and vary with population demographic, health, and socioeconomic characteristics. Therefore, findings from previous studies based on specific populations may not be generalizable to other countries. Furthermore, wealth gradients in child neurodevelopment appear to be dynamic rather than fixed and sensitive to population characteristics that modify their intensity.

© 2012 Elsevier Ltd. All rights reserved.

Introduction

Child development on physical, psychosocial, and cognitive domains is influenced by a complex set of socioeconomic, environmental, and genetic contributors (Maggi, Irwin, Siddiqi, & Hertzman, 2010). Among these, socioeconomic factors are especially important since they may affect access to several social, behavioral, and environmental inputs for child development (Hertzman et al., 2010). Early stressors linked to socioeconomic status may also influence child development through epigenetic mechanisms (Essex et al., 2011; Hertzman & Boyce, 2010),

although much more work is needed in this area. Socioeconomic gradients have been reported across a wide spectrum of child health and development indicators such as birth weight (Currie, 2009), survival (Houweling & Kunst, 2010), emotional and social development (Oliver, Dunn, Kohen, & Hertzman, 2007), cognitive/executive functioning (Sarsour et al., 2011), and brain functions (Sheridan, Sarsour, Jutte, D'Esposito, & Boyce, 2012) with children from higher socioeconomic status households having better outcomes. Early child health and development indicators are important predictors of future physical and mental health and wellbeing as well as human capital (Currie, 2009; Jefferis, Power, & Hertzman, 2002; Victora et al., 2008; Wadsworth & Kuh, 1997). There are several pathways through which early child health and development may influence subsequent health outcomes. One suggested channel with empirical evidence in the association between child cognitive ability and cardiovascular health during

* Corresponding author. Tel.: +1 319 384 3814.

E-mail addresses: george-wehby@uiowa.edu (G.L. Wehby), Ann-mccarthy@uiowa.edu (A.M. McCarthy).

adulthood is through adult socioeconomic achievement and health behaviors (Power, Jefferis, & Manor, 2010). Certain physical traits during childhood such as body weight and height have also been linked to cortisol levels during adulthood, suggesting a potential role for the hypothalamic–pituitary–adrenal axis (Power, Li, & Hertzman, 2006). Therefore, interventions that improve early child development may have cumulative long-run benefits that exceed those of treatments and interventions to restore or improve health later in life (Cunha & Heckman, 2007; Shonkoff, Boyce, & McEwen, 2009). The World Health Organization has highlighted socioeconomic inequalities in child development as a key contributor to health disparities throughout life and emphasized the importance of reducing child development inequalities especially through devising policy interventions that increase investments in early development on all domains as an effective approach for reducing health disparities later in life (CSDH, 2008).

Among the many measures of child health and development, child neurodevelopment early in life including in infancy and early childhood before school age is a particularly relevant measure encompassing several functional and behavioral milestones that are indicative of normal development and predictive of future health and wellbeing. Neurodevelopment represents the child's achievement on cognitive, fine- and gross-motor, language, and social adaptation skills (Patel, Pratt, & Greydanus, 2002). Regular evaluation of the child's performance on neurodevelopmental milestones early in life is recommended as part of routine pediatric care practices (American Academy of Pediatrics Staff, 2001). Similar to other indicators of child health and development, several studies have documented significant positive associations between improved early child neurodevelopment and future health and human capital including higher educational achievement and cognitive performance (Murray, Jones et al., 2006; Murray, Jones, Kuh, & Richards, 2007; Taanila, Murray, Jokelainen, Isohanni, & Rantakallio, 2005). For example, standing at an earlier age, which is an important gross-motor milestone, is positively associated with higher cognitive performance during adulthood (Murray, Veijola et al., 2006).

As mentioned above, an established literature has documented socioeconomic gradients in several measures of child physical, social, cognitive, and language development. However, little is known about the importance of family wealth for child neurodevelopment very early in life including during infancy (the first two years of life). The majority of prior work examining socioeconomic gradients in development has focused on specific neurodevelopmental domains such as language in children after age 3 years, generally finding positive wealth or income effects. For example, Paxson and Schady (2007) evaluated the effects of household wealth on child language development, measured by Peabody Picture Vocabulary Test, in a sample of children age 3–6 years from Ecuador. Measuring wealth with an index based on asset and housing quality conditions and generated using principal component analysis, the study found significant positive associations between wealth and language development scores. Maternal and father's education had also positive associations with language development. Only a few published studies have evaluated socioeconomic gradients in more holistic neurodevelopment measures or in multiple neurodevelopmental domains earlier in childhood. Ghuman, Behrman, Borja, Gultiano, and King (2005) studied a sample of children age 0–36 months from the Philippines. Neurodevelopment was assessed using the Revised Early Child Development Checklist, an instrument developed in the Philippines that included several neurodevelopmental domains. Adjusting for parental education, the study found insignificant effects of an index of family asset ownership and housing quality indicators on three

of four studied neurodevelopment domains, except for receptive language skills where the index had positive effects – a one standard deviation (SD) increase in the asset index was associated with a 0.05 SD increase in receptive language. Ermisch (2008) studied the role of parental behaviors in economic gradients in child cognitive and behavioral outcomes measured by the British Ability Scales Naming Vocabulary scale (BAS), Bracken School Readiness Assessment (BSRA), and Strengths and Difficulties Questionnaire (SDQ) in a sample of children age 3 years from the UK. Income was measured around 9 months of life. The study reported large income gradients in child development, with children from higher income households performing significantly better on the cognitive and behavioral scales.

There are some key gaps in the literature on socioeconomic backgrounds and early child development that we attempt to address in this paper. As indicated above, the majority of studies focus on specific developmental areas (physical, cognitive, language, or psychosocial), and very few ones use more holistic multi-domain measures of neurodevelopment. More importantly, less than a handful of studies evaluate socioeconomic gradients in neurodevelopment during infancy, and the majority study children after the first three years of life. While important, studies evaluating child development or neurodevelopment later in childhood may not reveal whether socioeconomic gradients originate earlier in life. In this regard, evaluating the role of family wealth in neurodevelopment very early in life including during the first two years of life is essential for identifying the earliest neurodevelopmental period that is sensitive to economic effects. This is needed for developing appropriately timed and cost-effective policies and interventions that can enhance early child development and result in large cumulative returns. To address this gap, we focus on studying wealth gradients in neurodevelopment within the first two years of life.

Another gap in the literature on neurodevelopment or non-physical development domains is that most studies focus on economic effects for the “average” child (a child at average development), instead of evaluating the heterogeneity in economic gradients by different levels of developmental ability. Developmental ability (or endowment) can be thought of as a latent all-encompassing index of genetic, socioeconomic, and environmental factors that determine the child's ranking on the distribution of the development measure, conditional on observed characteristics. Children at higher ranks of the development distribution are expected to have a greater developmental ability, conditional on observed differences. Since previous studies focus on estimating the income/wealth gradients at the “mean” of the development measures, their estimates apply to a child at an “average” developmental ability but may not apply to a child below or above average. Wealth gradients may vary for children with different abilities/endowments through interplays between wealth and the latent factors that influence developmental ability. For example, if household wealth and the physical environment are complements, the development of children in healthier physical environments may be more sensitive to household wealth (such as through wealthier parents having more quality time for healthy outdoor recreational activities) compared to those in worse physical environments (where both wealthy and poor parents may not engage as much in outdoor activities). Therefore, economic gradients may vary between more and less developmentally endowed children. Such heterogeneities will be masked by evaluating these gradients for children at “average” development and generalizing them to other children. We address this gap by employing an analytical model – quantile regression – that can evaluate the heterogeneity in wealth gradients at different rankings (quantiles) of the neurodevelopmental measure distribution.

Download English Version:

<https://daneshyari.com/en/article/7338100>

Download Persian Version:

<https://daneshyari.com/article/7338100>

[Daneshyari.com](https://daneshyari.com)